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EXAMINER

CANTELMO, GREGG

ART UNIT PAPER NUMBER

1745

DATE MAILED: 03/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/024,393	<b>Applicant(s)</b> SAISHO ET AL.	
	<b>Examiner</b> Gregg Cantelmo	<b>Art Unit</b> 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2003.
- 2a) ☒ This action is **FINAL**.      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-3, 13-17 and 21-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 21, 23 and 25 is/are allowed.
- 6) ☒ Claim(s) 1-3, 13-17, 26, 28, 29, 31 and 32 is/are rejected.
- 7) ☒ Claim(s) 22, 24, 27 and 30 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. In response to the amendment received December 22, 2003:
  - a. Claims 1-3, 13-17 and 21-32 are pending. Claims 4-12 and 18-20 have been cancelled;
  - b. The 112 first paragraph rejection is withdrawn in light of the amendment;
  - c. The prior art rejections stand in light of the amendment. The amendment further defining the claimed invention by incorporating new and previously unclaimed limitations thereby permitting finality of this office action.

### ***Claim Objections***

2. Claims 3, 15, 22, 24, 28 and 31 objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The claims recite that the through holes are such that the electrodes "may be" connected in the shortest possible distance. The term "may be" fails to further limit for any configuration wherein the electrodes are not connected by the shortest distance (in essence connecting the electrodes at any distance). Effectively then the limitations of claims 3, 15, 22, 24, 28 and 31 for an arrangement which does not connect the electrodes in the shortest possible distance (therefore any distance) is held to be taught

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within the respective base claims. Applicant is advised to amend claims 3, 22 and 28 by amending the term "may be" to --are-- to overcome this objection. Note that original claim 3 recited this phrase.

3. Applicant is advised that should claim 13 be found allowable, claim 14 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

#### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-3 and 13-17 rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a range of 5-100 microns, does not reasonably provide enablement for a narrower range of 11-100 microns. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. There is no specific data point of 11 microns disclosed throughout the specification and the specification lacks sufficient specificity to the range defined in claim 1.

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6. Claims 1-3 and 13-17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. As discussed above there is no teaching of the range of 11-100 microns and this specific range as now claimed is held to constitute new matter.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. patent No. 5,851,693 (Sano).

Sano discloses nonaqueous electrolyte secondary cell comprising a positive electrode, a negative electrode, a nonaqueous electrolyte, a separator interposed between the positive electrode and the negative electrode, the positive electrode having a positive electrode active material comprising a chemical compound capable of reversibly intercalating lithium and the negative electrode having a negative electrode active material comprising a material capable of reversibly intercalating lithium, wherein the separator has through holes for passing lithium dendrites therethrough. The

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through holes having a pore size in the range of 10-60 microns (abstract, col. 4, ll. 54-58 and Fig. 1 as applied to claim 1).

As discussed in the claim objection above, claim 3 does not further limit claim 1 with respect to a possible shortest distance connection between the electrodes. Sano having a porous separator disposed between the electrodes as discussed above, sufficiently reads on claim 3. In addition claim 3 does not clearly define any value or range of values defining "the shortest possible distance" and effectively can be any distance since this limitation is virtual and relative (as applied to claim 3).

### ***Response to Arguments***

9. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 13-15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sano in view of U.S. patent No. 5,681,357 (Eschbach).

The teachings of claims 1 and 3 with respect to Sano have been discussed above and are incorporated herein.

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The difference between claims 13-15 and Sano is that Sano does not explicitly teach of a maximum 30 micron diameter size.

The range of 10-60 microns encompasses 30 microns with sufficient specificity. More clearly that the instant application discloses a range from 5-100 microns and the prior art of Sano teaching of a range of 10-60 microns. The range of Sano is within the broader range of the instant application and includes values of 30 microns or less. One of ordinary skill in the art would have had sufficient disclosure from the teachings of Sano to use any of the pore diameters from 10-60 microns, including those of 30 microns or less.

Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesche, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). The instant application fails to show any criticality to 30 microns alone as opposed to a range of 30 microns or less.

It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Sano by selecting the pore

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size to be 30 microns since the range of Sano teaches to such a value with sufficient specificity and since such a value would have provided the requisite porosity to the separator as needed by Sano.

12. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sano in view of U.S. patent No. 4,743,520 (Rosansky).

The teachings of claim 1 with respect to Sano have been discussed above and are incorporated herein.

The difference between claim 16 and Sano is that Sano does not teach or suggest providing a separator having a pore density from 1-4 pores per centimeter square.

Barrier 20 consists of a perforated non-porous, non-electrolyte permeable material, with the number of perforations or percent open area being a function of the specific cell's design parameters. For example, if a cell is required that must operate continuously at 0.1 amps and be capable of supporting 25 amp pulse loads with the caveat that the cell have a short-circuit current (for safety purposes) of only 15 amps, the non-porous barrier may be provided with only 50% open area. Likewise, if a cell is required that must sustain a continuous discharge of only a few milliamps, be capable of high current pulses, but must have a fairly low sustained short-circuit current, barrier 20 may only have, for example, a 20% open area. It becomes clear, therefore, that for a given basic cell design a whole family of electrochemical cells can be generated with different operating characteristics by simply varying the percent open area of the non-porous barrier. As the percent open area of the barrier becomes zero, the resultant cell



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can only sustain very low discharge currents and will polarize immediately as the currents are increased. It has been found that the current can be most effectively limited and controlled by adjusting the open area to comprise from about 1% to 60% of the total surface area of the barrier (Rosansky, col. 3, ll. 3-30).

The motivation for selecting the pore density is relative to the requirements of the specific cell as taught by Rosansky, thus selecting the pore density is held to be a result-effective optimized parameter wherein optimizing the pore density is shown to optimize the cell current.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Sano by selecting a particular pore density for the separator since selection of the pore density is shown to be a result-effective optimizes parameter wherein optimizing the density is shown to have optimized the cell current.

13. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sano in view of U.S. patent No. 5,681,357 (Eschbach).

The teachings of claim 1 with respect to Sano have been discussed above and are incorporated herein.

The difference between claim 17 and Sano is that Sano does not teach or suggest providing a conductive polymer provided between the separator and the electrodes.

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Fig. 2 of Eschbach discloses a separator 52 having a PVDF conductive polymer layer disposed on the sides of the separator which face and contact the electrodes of the battery (See Fig. 2 and col. 4, 11. 1-30).

The motivation for providing a PVDF on the sides of the separator is that the coating serves to aid in the absorption of the electrolyte in the separator and upon "gelling", improve the adhesion between the separator and electrodes (col. 5, 11. 6-12).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Sano by providing a PVDF on the sides of the separator since it would have aided in the absorption of the electrolyte in the separator and upon "gelling", improved the adhesion between the separator and electrodes.

14. Claim 26, 28, 29, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano in view of U.S. patent No. 4,743,520 (Rosansky).

Sano discloses nonaqueous electrolyte secondary cell comprising a positive electrode, a negative electrode, a nonaqueous electrolyte, a separator interposed between the positive electrode and the negative electrode, the positive electrode having a positive electrode active material comprising a chemical compound capable of reversibly intercalating lithium and the negative electrode having a negative electrode active material comprising a material capable of reversibly intercalating lithium, wherein the separator has through holes for passing lithium dendrites therethrough. The through holes having a pore size in the range of 10-60 microns (abstract, col. 4, ll. 54-58 and Fig. 1 as applied to claim 26).

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As discussed in the claim objection above, claim 3 does not further limit claim 1 with respect to a possible shortest distance connection between the electrodes. Sano having a porous separator disposed between the electrodes as discussed above, sufficiently reads on claim 3. In addition claim 3 does not clearly define any value or range of values defining "the shortest possible distance" and effectively can be any distance since this limitation is virtual and relative (as applied to claim 28).

The differences between instant claims 26, 28, 29 and 31 and Sano are that Sano does not explicitly teach of the pore density (claims 26, 28, 29 and 31) or of the maximum diameter being 30 microns (claims 29 and 31).

With respect to the pore density:

Barrier 20 consists of a perforated non-porous, non-electrolyte permeable material, with the number of perforations or percent open area being a function of the specific cell's design parameters. For example, if a cell is required that must operate continuously at 0.1 amps and be capable of supporting 25 amp pulse loads with the caveat that the cell have a short-circuit current (for safety purposes) of only 15 amps, the non-porous barrier may be provided with only 50% open area. Likewise, if a cell is required that must sustain a continuous discharge of only a few milliamps, be capable of high current pulses, but must have a fairly low sustained short-circuit current, barrier 20 may only have, for example, a 20% open area. It becomes clear, therefore, that for a given basic cell design a whole family of electrochemical cells can be generated with different operating characteristics by simply varying the percent open area of the non-

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porous barrier. As the percent open area of the barrier becomes zero, the resultant cell can only sustain very low discharge currents and will polarize immediately as the currents are increased. It has been found that the current can be most effectively limited and controlled by adjusting the open area to comprise from about 1% to 60% of the total surface area of the barrier (Rosansky, col. 3, ll. 3-30).

The motivation for selecting the pore density is relative to the requirements of the specific cell as taught by Rosansky, thus selecting the pore density is held to be a result-effective optimized parameter wherein optimizing the pore density is shown to optimize the cell current.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Sano by selecting a particular pore density for the separator since selection of the pore density is shown to be a result-effective optimizes parameter wherein optimizing the density is shown to have optimized the cell current.

With respect to the maximum diameter of 30 microns:

The range of 10-60 microns encompasses 30 microns with sufficient specificity. More clearly that the instant application discloses a range from 5-100 microns and the prior art of Sano teaching of a range of 10-60 microns. The range of Sano is within the broader range of the instant application and includes values of 30 microns or less. One of ordinary skill in the art would have had sufficient disclosure from the teachings of

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Sano to use any of the pore diameters from 10-60 microns, including those of 30 microns or less.

Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesche, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). The instant application fails to show any criticality to 30 microns alone as opposed to a range of 30 microns or less.

It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Sano by selecting the pore size to be 30 microns since the range of Sano teaches to such a value with sufficient specificity and since such a value would have provided the requisite porosity to the separator as needed by Sano.

15. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sano in view of Rosansky as applied to claim 26 above, and further in view of U.S. patent No. 5,681,357 (Eschbach).

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The teachings of claim 26 with respect to Sano have been discussed above and are incorporated herein.

The difference between claim 32 and Sano is that Sano does not teach or suggest providing a conductive polymer provided between the separator and the electrodes.

Fig. 2 of Eschbach discloses a separator 52 having a PVDF conductive polymer layer disposed on the sides of the separator which face and contact the electrodes of the battery (See Fig. 2 and col. 4, 11. 1-30).

The motivation for providing a PVDF on the sides of the separator is that the coating serves to aid in the absorption of the electrolyte in the separator and upon "gelling", improve the adhesion between the separator and electrodes (col. 5, 11. 6-12).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Sano by providing a PVDF on the sides of the separator since it would have aided in the absorption of the electrolyte in the separator and upon "gelling", improved the adhesion between the separator and electrodes.

### ***Response to Arguments***

16. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 103***

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17. Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takauchi, of record and for the reasons of record.

Takauchi discloses a nonaqueous electrolyte secondary cell comprising a positive electrode, a negative electrode, a nonaqueous electrolyte, a separator interposed between the positive electrode and the negative electrode, the positive electrode having a positive electrode active material comprising a chemical compound capable of reversibly intercalating lithium and the negative electrode having a negative electrode active material comprising a material capable of reversibly intercalating lithium, wherein the separator has through holes for passing lithium dendrites therethrough (abstract, Figs. 1-3 and col. 10, ll. 18-27 as applied to claim 1).

The holes have an average pore size of up to 10 microns (col. 10, ll. 18-27 as applied to claim 1).

As discussed in the claim objection above, claim 3 does not further limit claim 1 with respect to a possible shortest distance connection between the electrodes. Takauchi having a porous separator disposed between the electrodes as discussed above, sufficiently reads on claim 3. In addition claim 3 does not clearly define any value or range of values defining "the shortest possible distance" and effectively can be any distance since this limitation is virtual and relative (as applied to claim 3)

The difference between instant claim 1 and Takauchi is that Takauchi does not teach of the pore size between 11-100 microns.

Takauchi teaches that when the average pore size is greater than 10 microns, the possibility of short circuit due to the formation of dendrites increases. Takauchi

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could not have blindly made such assertion without some evidence that pore sizes greater than 10 microns generate this result (col. 10, ll. 24-260).

Additionally, it is expressly noted that the instant application fails to show any criticality to the lower limit of 11 microns. The amendment being held as an attempt by applicant to claim a range different from the upper limit of the prior art without evidence of an express teaching of 11 microns or any significance to this value.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made that pore sizes in excess of 10 microns would have promoted dendrite growth as taught by Takauchi and in order to have made such an assertion would have required testing and analysis of pore sizes in excess of 10 microns to arrive at such a conclusion.

Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesche, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985).



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18. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takauchi in view of U.S. patent No. 5,681,357 (Eschbach).

The teachings of claim 1 with respect to Takauchi have been discussed above and are incorporated herein.

The difference between claim 17 and Takauchi is that Takauchi does not teach or suggest providing a conductive polymer provided between the separator and the electrodes.

Fig. 2 of Eschbach discloses a separator 52 having a PVDF conductive polymer layer disposed on the sides of the separator which face and contact the electrodes of the battery (See Fig. 2 and col. 4, 11. 1-30).

The motivation for providing a PVDF on the sides of the separator is that the coating serves to aid in the absorption of the electrolyte in the separator and upon "gelling", improve the adhesion between the separator and electrodes (col. 5, 11. 6-12).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Takauchi by providing a PVDF on the sides of the separator since it would have aided in the absorption of the electrolyte in the separator and upon "gelling", improved the adhesion between the separator and electrodes.

### ***Response to Arguments***

19. Applicant's arguments filed December 22, 20023 have been fully considered but they are not persuasive.

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Applicant does not clearly argue the narrower claimed range of claim 1. It would appear at best then that the position of Applicant would be that because Takauchi teaches that pore sizes of greater than 10 microns would not be used by Takauchi since such pore sizes would promote dendrite growth across the separator. And for such reasons then the range of 11-100 would not have been taught or suggested by Takauchi.

The Examiner respectfully disagrees.

As discussed above, it is held that the assertion in Takauchi that pore diameters which are greater than 10 microns generates dendrite formation across the separator was either inherently or obviously made in light of prior art analysis of pore sizes greater than 10 microns in a separator. Thus while Takauchi teaches using pore sizes of 10 microns or less, a comparison between this limit and values in excess of this limit must have been performed to definitively arrive at such a conclusion.

In addition considering the amendment merely defining the range to be as low as 11 microns (unsupported and not shown to be critical over the broad range of 5-100 microns as disclosed in the instant application), there is a strong lack of evidence to support Applicant's position that claim 1 is allowable.

In the absence of clear evidence to the criticality of the range of 11-100 microns, in light of the new matter issue to claim 1 and in light of the complete teachings of Takauchi, the Examiner maintains that one of ordinary skill in the art would have had sufficient teachings to render claim 1 obvious.

***Allowable Subject Matter***

20. Claims 21, 23, 25 are allowed. Claims 22 and 24 would be allowed upon resolution of the aforementioned claim objection.

21. The following is an examiner's statement of reasons for allowance: none of the prior art of record are considered to teach or suggest the nonaqueous electrolytic secondary cell as defined in claim 21. In particular of the through holes of the separator having a diameter of 5-100 microns and wherein the through holes have a substantially straight-line shape extending completely through the separator, and the positive electrode and negative electrode are connected thereby.

Having through hole diameter sizes from 5-100 in combination with the substantially straight-line shape of the through holes extending completely through the separator provides a sufficient diameter size which promotes dendrite growth across the separator as discussed in the instant application and having such diameter sizes in combination with the straight-line shape of the through holes provides. When the through holes have a substantially straight line-shape and the positive electrode and the negative electrode are connected thereby, lithium dendrites can smoothly grow and thereby electrical contact between the positive electrode and the negative electrode is formed at an earlier stage of lithium dendrite formation. Thus, safety of the cell is further improved (specification, page 4, ll. 6-19).

In light of these facts, one of ordinary skill in the art would not have found any teaching or suggestion in the prior art of record to provide the arrangement as defined in

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claim 21, and as shown by for example would have found teachings away from the claimed configuration.

Therefore claims 21, 23 and 25 are held to be novel over the prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

22. Claims 27 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

23. The following is a statement of reasons for the indication of allowable subject matter: as with claim 21 above, the combination of limitations in claim 27 (and further dependent claim 30) includes the combination of the through holes with a diameter of 5-100 microns and the through holes having a substantially straight line shape extending completely through the separator. Reasons for indicating this combination as allowable subject matter is discussed above and incorporated herein.

### ***Conclusion***

24. Due to the outstanding 112 rejection to claim 1, no patentability determination to dependent claims 2-3 and 13-17 can be made at this time. However it is noted that the teachings of claim 2 would fall under similar reasons for allowance discussed in the allowable subject matter above due to the combination of the pore diameters in

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combination with the straight-line shape holes extending completely through the separator.

25. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (571) 272-1283. The examiner can normally be reached on Monday to Thursday from 9 a.m. to 6 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. FAXES received after 4 p.m. will not be processed until the following business day. Information regarding the status of an application may be obtained from the Patent

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Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gregg Cantelmo  
Primary Examiner  
Art Unit 1745

gc

A handwritten signature in cursive script, appearing to read "Gregg Cantelmo".

March 22, 2004